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might be, if, after its brief sensational existence I could not even *refer* to it, it might as well have been a pang of bitterest sorrow. This identity of meaning is, however, given me as really as anything can be. It is quite immaterial whether or not the psychological processes vary with the recall, whether the memory-image is each time a new one or not; so long as the true thought-object is the one referred to, there is some hope that I can turn it to account. Otherwise neither absolutist nor humanist can say anything about it. So, after all, the mere psychological timelessness of meanings, either as genuine recurrents or as objects of reference (ideal, assumed recurrents), is the point of departure for every logical theory and not the goal of the visionary. What we are all looking for in active life, however, is not non-temporal meanings, but rather ones that will wear well. And neither logic nor psychology has the monopoly on these.

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THE IDEAS AND TERMS OF MODERN PHILOSOPHICAL ANATOMY.[1]

THE ideas of philosophical anatomy have been developed during three periods of human thought: First, the Greek, in which adaptation was clearly perceived as the central phenomenon of life, in its morphological and physiological expression. Second, the pre-Darwinian period, in which the idea of the environmental relations was developed especially by Bacon; and various forms of morphological, physiological and especially psychical adaptation were developed gradually through the studies of Buffon, Lamarck, Geoffroy St. Hilaire and more especially Goethe; adaptations began to be distinguished broadly into *primary,* or those which had been of use in past time, and *secondary,* or those which were recent in origin and in full use at the present time. Even prior to these writers, however, Vesalius in his studies of human anatomy perceived the importance of this distinction. Philosophical anatomy really owes to Darwin himself the fundamental ideas which are involved in the terms primitive, retrogressive, progressive and dominant, and are understood with increasing clearness. This is the third period of anatomy as established on evolution. Huxley in his brilliant essay of 1880 on 'The Laws of Evolution as Applied to the Mammalia' was the first to emphasize persistent primitive characters and modernized or adaptive characters, laying great stress on the importance of the former in questions of phylogeny. Among many other anatomical papers E. Ray Lankester's 'Degeneration, a Chapter in Darwinism,' brought out especially the significance of retro gressive changes.

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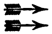
Huxley was a master of logic, but even his keen vision failed to recognize the vast importance of the element of analogy, or similarity of function, in bringing about a similarity of structure in evolution independently of real similarity of kinship. This final phase in anatomical analysis is largely due to the broad extension of paleontology, and the demonstration over and over again in nature that similar forms have been produced independently either by parallelism from animals related in ancestry, or by convergence in animals unrelated in ancestry. To these processes and results of similar modeling Lankester has applied the fitting 'terms homoplasy' and 'homoplastic.'

EXPLANATION OF THE TABLE.

In the Table an attempt is made, for the first time to my knowledge, to bring together all these processes of change and to indicate their interrelations. There can be little disagreement as to the terms in columns I., II., III., but some surprise may be felt as to the broad inclusiveness of column IV. The justification for this column lies in the fact that in the analysis of any animal form the questions which each anatomist should put to himself as regards each character are: Is this a primitive or a secondary character? If primitive, is it in a balanced or stationary condition, or is it in process of change? Secondly, is this a retrogressive or a progressive character? Questions to be answered certainly only by the evidence afforded by ontogeny or paleontology, and in a comparatively limited number of cases by comparative anatomy. Further, it may be necessary to ask: Is this a dominant character, or one which has attained such importance in evolution as to crowd out and overshadow all others?

Anatomical analysis, however, does not stop here; we must constantly be on the lookout for transitional characters or characters in the very act of change. These transitional or evolutional characters appear at present to be of four kinds: first, *modifications,* or such as have been brought about during the life of the individual without necessarily being connected with germinal changes; second, *fluctuations,* or fluctuating variations, changes of degree or proportion which may be due either to somatic or to germinal causes, one of the most difficult problems in regard to fluctuations being to ascertain how much is germinal and how much is purely somatic; third, *saltations,* which are altogether germinal, or at least prenatal,

THE IDEAS AND TERMS OF PHILOSOPHICAL ANATOMY.

		COMPARISON.		
I.	II.	III.	IV. As Regards Present Time.	V. As Regards Origin.
Life is the continuous adjustment of internal and external factors and processes. Adaptation is of the broadest character and relations, internal and external, including:		In every animal adaptations of the past, present and future mingle, and may be broadly distinguished into:	Animal and plant types, organs and functions are accordingly found in all grades of development and adaptiveness, with reference to past, present and future activity.	The results of adaptation in different animals and plants are also comparative, *i. e.*, similar, or dissimilar, according to the operation of similar internal (*i. e.*, hereditary) and environmental conditions.
Environmental or Bionomic, *i. e.*, in relation to physical and living surroundings, to geologic, geographic, physiographic, meteorologic, faunal and floral conditions or changes. Morphological or Anatomical, *i. e.*, structural, in organs, direct or correlated. Physiological or Functional, *i. e.*, in habits and uses of organs. Psychical and Neurological, in the brain, nervous system, and psychic life generally, imitations, instincts, intelligence.	ADAPTATION AND ADAPTABILITY.	Primary or Primitive.	1. *Primitive.* 'Persistent primitive,' or arrested types, organs and structures which continue to be useful although perhaps of very great antiquity, in a balanced or stationary, also 'progressive' or 'retrogressive' condition.	I. Homologous, *i. e.*, *Homogenous.* II. Analogous. *Parallel.* Analogous adaptations, *i. e.*, similar characters arising independently in *similar or related animals or organs*, causing a similar evolution, and resulting in parallelisms.  *Convergent.* Similar adaptations arising independently in *dissimilar or unrelated animals or organs*, causing a secondary similarity or approximation of type, resulting in *convergence.* III. Non-Analogous. *Divergent.* Increasing specialization and differentiation resulting in 'divergence' or 'adaptive radiation.'
		Transitional.	1. *Modifications.* Somatic and in part germinal changes, environmental, also use and disuse. 2. *Fluctuations.* Exclusively germinal, fluctuating changes of degree, continuous. 3. *Saltations.* Germinal, marked changes of kind, sports, mutations of De Vries, discontinuous variations. 4. *Rectigradations.* Continuous germinal changes in a single direction, mutations of Waagen.	
		Secondary or Adaptive.	1. *Retrogressive.* Declining types, organs, habits and functions. Reduced, degenerating, partly functional, and functionless, passing through the stages of 'regressional,' 'vestigial,' 'variable,' 'atavistic,' or 'reversional' (according to certain percentages of occurrence) into 'recessive' (*i. e.*, very rarely reversional). 2. *Progressive.* Rising or developing types, habits, organs and functions. Rudimentary, prophetic or nascent organs and structures in the true sense of beginning, becoming sub-functional, then functional or fully useful. 3. *Dominant.* Organs, etc., attaining such importance as to overshadow all others, often leading to the extinction of the types through extreme specialization.	
	The collective phenomena of fitness and the evolution of fitness as the essential and distinctive feature of life.	Fitness in time, *i. e.*, in past time, in the present, and tending toward fitness in the future.	Grades or degrees of fitness as determined in *individuals* by direct study or comparison, in the sciences of anatomy, comparative anatomy, paleontology, embryology, in ontogeny, fœtal and larval life.	Fitness of certain groups or organs in comparison with *other groups* (*i. e.*, classes, orders, families, genera, species, varieties) as well as in comparison with organs and functions in other groups of animals.

in origin, including marked changes of kind, the 'sports' of Darwin and Galton, the 'discontinuous variations' of Bateson, and the 'mutations' of de Vries. Wide celebrity has been given to the word 'mutation' through the brilliant experiments and observations of de Vries, but the original significance of this term as employed by Waagen and Scott was a different one, and I think it probable that Waagen used it in the sense of determinate variation. Fourth, *rectigradations*, a new term with which I propose to characterize what in the year 1889 I described as 'definite variations'; it embraces changes which many writers have described as 'orthogenetic,' under the supposed law of direct change (usually in an adaptive direction), which is termed Orthogenesis; these probably are the 'mutations' of Waagen.

All the processes in column IV. are those which may be observed at the time or moment of observation in any organism, provided we have sufficient keenness of perception or sufficient knowledge to discriminate between them.

The elements of comparison given in column V., on the other hand, relate strictly to questions of origin, or to the past and the future, also to questions of comparison. The first broad distinction of comparison is between I., Homologous and, II., Analogous characters. In a strict interpretation homologous refers only to those elements which are 'homogenous' (Lankester), or have an actual similarity of origin or ancestry. Under analogous characters there is a simple distinction to be drawn between the results of parallelism and of convergence, terms which I maintain should be used in a somewhat stricter sense than they have been hitherto. Looking to the past and future we have III., the non-analogous characters and the broad phenomena of divergence. Appreciation of animal divergence, or of divergence in special structures and organs, naturally belongs to the evolutionary period of anatomical thought; a period beginning with the branching system of Lamarck and continued in the still clearer perception of divergence in the writings of Darwin. I have elsewhere proposed to employ the term 'adaptive radiation' for the general results of divergence as observed in a single group, distinguishing such a group in process of divergence as a 'radiation,' either a 'continental radiation' where diverging on a large scale, or a 'local radiation' where diverging in a more restricted environment.

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